

*A PRELIMINARY EXAMINATION OF THE EVOCATIVE  
EFFECTS OF THE ESTABLISHING OPERATION*

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We attempted to isolate the evocative effects of the establishing operation for positively reinforced problem behavior with 2 participants. The study consisted of three phases. First, a functional analysis identified tangible items (Participant 1) and attention (Participant 2) as maintaining problem behavior. Second, access to tangible items and attention was systematically controlled (continuous access vs. no access) immediately prior to functional analysis sessions in which these consequences were delivered contingent on problem behavior. Results of this phase indicated that problem behavior occurred at higher levels when access to tangible items and attention was restricted. In the third phase, prior access was again controlled, but problem behavior produced no consequences. Results of this final phase indicated that problem behavior occurred at higher levels during extinction sessions when participants did not have prior access to the reinforcers.

DESCRIPTORS: autism, establishing operations, extinction, functional analysis, antecedent assessment

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Michael and colleagues have postulated that establishing operations (EOs) have two simultaneous yet independent effects (Laraway,

Snyckerski, Michael, & Poling, 2003; Michael, 1982, 1993, 2000). First, the EO can alter the reinforcing effects of a stimulus. This is termed the *reinforcer-establishing* effect. For example, when an organism is deprived of food, food becomes a more powerful reinforcer (Vollmer & Iwata, 1991). The other effect is termed *evocative* and produces an increase in behaviors that have been previously reinforced by that stimulus. For example, when the organism is deprived of food, there will be an increase in

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behaviors (e.g., foraging) that have been reinforced with food in the past. In this study we attempted to isolate the evocative effects of the EO on positively reinforced problem behavior for 2 individuals with intellectual disabilities.

## METHOD

### *Participants, Settings, and Target Behaviors*

Sam and John were 14 and 20 years old, respectively. Both functioned at the 2-year-old level on the Vineland Adaptive Behavior Scales—Interview Edition (Sparrow, Balla, & Cicchetti, 1984) and scored in the severe range of the Childhood Autism Rating Scale (Schopler, Reichler, & Renner, 1988). Both participants attended a school for students with autism. All sessions were conducted in a classroom with no other students present. Sam's target behavior included head hitting, head banging, hand biting, punching, and kicking. John's behavior included body hitting, skin picking, inappropriate self-touching, hair eating, and elopement. Operational definitions of the target responses are available from the first author.

### *Data Collection, Interobserver Agreement, and Experimental Design*

All data were collected using a 10-s partial-interval procedure. Interobserver agreement was conducted on approximately 75% of sessions across all phases of the study. Mean interobserver agreement for Sam and John was 98% (range, 83% to 100%) and 97% (range, 87% to 100%), respectively. Experimental control was demonstrated using a multielement design across each phase of the experiment (see below).

### *Experimental Procedure*

The study was conducted in three phases as outlined below.

*Functional analysis.* A functional analysis based on the procedures described by Iwata,

Dorsey, Slifer, Bauman, and Richman (1982/1994) was conducted to identify the maintaining contingencies of Sam's and John's problem behaviors. A tangible condition (access to snacks contingent on problem behavior) was included for Sam based on staff reports. An alone condition was not included for Sam, because staff reported that he never engaged in problem behavior when left alone. All sessions of the functional analyses lasted 5 min.

*Pre-session access versus no access to the reinforcer.* The tangible and attention conditions of the functional analysis were replicated for Sam and John, respectively. Both tangible items (Sam) and attention (John) were delivered on a fixed-ratio 1 schedule during these sessions. Access to the putative reinforcers was systematically controlled immediately prior to the functional analysis in an attempt to isolate an EO for tangibly maintained (Sam) and attention-maintained (John) problem behavior. Pre-session access for Sam consisted of giving him unlimited access to snacks for 10 min immediately prior to tangible sessions. Pre-session no access for Sam consisted of conducting tangible sessions approximately 30 min before lunch, which ensured that he had not received any snacks that day. Pre-session access for John consisted of engaging him in continuous social interaction for 15 min immediately prior to attention sessions. Pre-session no access for John consisted of placing him in a room on his own for 15 min prior to attention sessions.

*Pre-session access versus no-access extinction.* Pre-session access versus no-access conditions were identical to the previous phase. However, no consequences were programmed for problem behavior during this phase. For Sam, snacks were visible but unavailable during tangible sessions. A therapist sat next to John but ignored all behavior during attention sessions. In other words, the participants' problem behavior was placed on extinction. This phase of the experiment was conducted in an attempt to isolate the evocative effects of the EO.

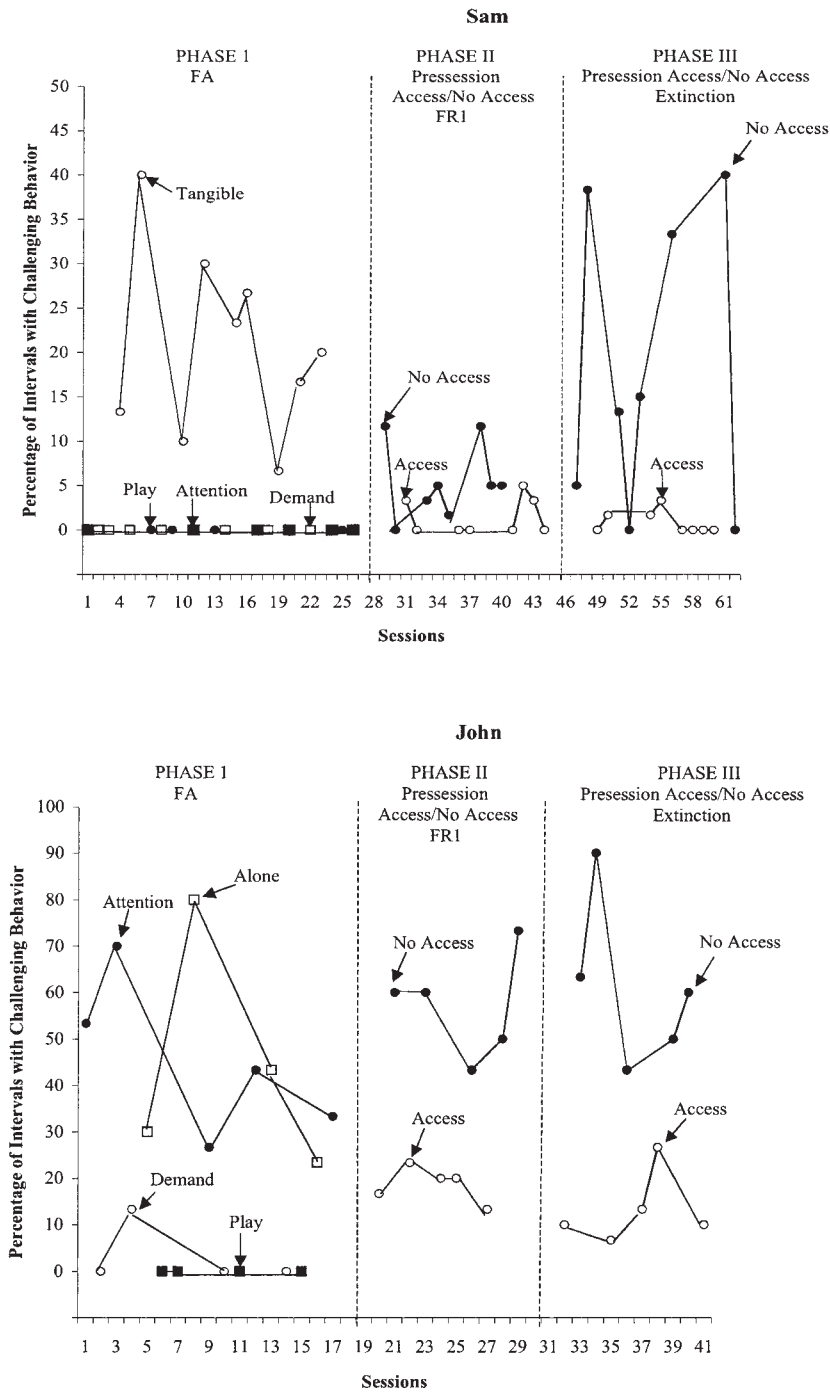


Figure 1. Percentage of intervals with problem behavior for Sam (top) and John (bottom) across the experimental phases.

## RESULTS AND DISCUSSION

Results of the functional analyses are presented in Phase 1 of Figure 1. Problem behavior occurred exclusively in the tangible condition for Sam, indicating that behavior was maintained by positive reinforcement in the form of access to food. John's problem behavior occurred in both the alone and attention conditions, suggesting multiple sources of control. Results of the pre-session access or no-access manipulation demonstrate that higher levels of problem behavior occurred in the tangible (Sam) and attention (John) sessions when they were preceded by restricted access to the reinforcers, suggesting that restricted access functioned as an EO for tangibly maintained (Sam) and attention-maintained (John) problem behavior. Finally, the results of pre-session access or no access followed by extinction revealed higher levels of problem behavior during extinction when preceded by restricted access to the stimuli that maintained problem behavior for both Sam and John. These results demonstrate the evocative effect of the EO because reinforcement was never delivered during the extinction conditions.

Overall, these results suggest that the evocative function of the EO may be worthy of future investigation. For example, availability of reinforcers prior to sessions seemed to have a significant impact on levels of problem behavior during extinction. Applied researchers might examine a combination of extinction with antecedent access to reinforcers, because such a combination might mitigate many of the negative side effects associated with extinction (cf. Lerman & Iwata, 1996). Isolating and manipulating putative EOs may also be helpful in clarifying operant functions when functional analysis results are unclear or when problem behavior appears to be multiply controlled. An example of this is presented in John's data.

John's functional analysis indicated that his behavior was multiply controlled. We isolated and manipulated a putative EO in the second phase. The results of this phase confirmed that John's behavior was maintained (at least in part) by attention, because his behavior was higher in the attention condition when the EO was in effect. Future research should attempt to replicate the findings of this study and extend the analysis to problem behavior maintained by other forms and contingencies of reinforcement.

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